a sufficient quantity of these ingredients in a state to be immediately taken up; the second, that of waiting until the action of decomposing agents disengages a fresh portion of those ingredients from the soil (as by letting the land remain fallow); and the third, that of accelerating this decomposition by mechanical and chemical means.

Thirdly, that it is probable that in most districts a sufficient supply of phosphoric acid and of alkali for the purpose of agriculture lies locked up within the bowels of the earth, which might be set at liberty and rendered available by the application of the artificial means above alluded to.

Fourthly, that the aim of nature seems to be to bring into this soluble, and therefore available condition, these inorganic substances by animal and vegetable decomposition, and therefore that we are counteracting her beneficial efforts when we waste the products of this decomposition by a want of due care in the preservation of the various excrementitious matters at our disposal.

Fifthly, that although we cannot deny that plants possess the power of substituting certain mineral ingredients for others, yet that the limits of this faculty are still imperfectly known, and the degree in which their healthy condition is affected by the change is still a matter for further investigation.

Lastly, that the composition of various plants, as given in this paper, differs so widely from that reported by Sprengel and others, that we are supplied with an additional argument in favour of the importance of having the subject of ash-analysis taken up by a public body, such as the Royal Agricultural Society of England, possessed of competent means and facilities for deciding between the conflicting authorities, and supplying us with a more secure basis for future calculations.

---

May 29, 1845.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

"On the Ashes of Wheat." By William Sharp, Esq., F.R.S.

The experiments recorded in this paper were undertaken principally with the ultimate view of ascertaining with exactness what quantity of inorganic matter is removed from the soil by the seeds of a crop of wheat. The author first inquires what is the average amount of the inorganic or incombustible portion of a given quantity of wheat; a question to which no satisfactory answer has yet been given. The result of the author's experiments is, that wheat yields, by slow combustion, a residue of from $1\frac{1}{2}$ to $1\frac{3}{4}$ per cent. He then proceeds to determine by experiment the degree in which this result is influenced by previous drying at different temperatures, varying from 230° to 260° Fahr., and finds that a heat of 245° is not sufficient to expel all the moisture contained in wheat; for while

the loss of weight is then about 8 per cent. by a heat of 260°, the amount of this loss is 10 per cent. When the heat is so great as to occasion decomposition, the saline matter contained in the wheat fuses, and a portion of the carbon becomes so entangled or firmly adherent to it, as to be incapable of separation by burning. Hence he recommends, in order to obtain greater uniformity in the results, that the wheat subjected to these experiments should be dried at a low temperature, such as that of a room in summer, and be allowed to remain a few days under its influence. The author tried the effect of the addition of nitric acid, with a view to save time by accelerating the combustion; but found that the results could not be relied upon when this plan was adopted, and he was therefore obliged to relinquish it. He next directed his inquiries to the ascertaining whether the quantity of inorganic matter was in proportion to the specific gravity of the grain, that is, to its weight per bushel; and this he found in general to be the case. The conclusion he deduces from this investigation is, that the mean amount of inorganic matter removed from the soil by the grain of a crop of wheat is exactly one pound per acre.

"On Benzoline, a new organic Salt-base obtained from Oil of Bitter Almonds." By George Fownes, Esq., F.R.S.

Pure oil of bitter almonds is converted, by the action of a strong solution of ammonia, into a solid white substance having a crystalline form, and which was termed by M. Laurent *hydrobenzamide*. The author found that this substance, by the further action of alkalies, became harder and less fusible than before, and not differing in chemical composition from the original substance, but exhibiting the properties of an organic salt-base. To this substance the author gives the name of *benzoline*. He finds that the salts which it forms by combination with acids are, in general, remarkable for their sparing solubility; and that many of them, as the hydrochlorate, the nitrate and the sulphate, are crystallizable. Of the properties of these salts the author gives a detailed account.

---

June 5, 1845.

Very Rev. DEAN OF ELY in the Chair.

"Electro-Physiological Researches." Memoir First. By Professor Carlo Matteucci. Communicated by Michael Faraday, Esq., D.C.L., F.R.S.

The author describes several arrangements by which he was enabled to make new experiments in confirmation of the laws of muscular currents, of which he has given an account in his recent work, entitled "Traité des Phénomènes Electro-Physiologiques des Animaux." He finds that, in these experiments, the employment of a galvanometer is unnecessary, as the sensibility of the electroscopic frog